

TECHNOLOGY
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September 1, 1951

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



Giant Cockroach

See Page 134

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VETERINARY MEDICINE

Hint for Polio Vaccine

Ways of producing more meat and saving of Thorough-bred baby foals with Rh blood problem also suggested to American Veterinary Medical Association meeting.

► AN AID to polio fighting, ways of producing more meat and tests that will help horse breeders were reported at the meeting of the American Veterinary Medical Association in Milwaukee.

For polio fighting there is a hint that the virus of deadly Newcastle disease of chickens might help in producing a vaccine against poliomyelitis in humans. Monkeys developed polio more slowly, were better able to resist its fatal effects and recovered faster when they had been infected with Newcastle disease virus before being exposed to the polio virus, Drs. R. L. Reagan, P. M. Schenck, H. D. Livenweaver and A. L. Brueckner of the University of Maryland reported.

Chickens that get Newcastle disease sometimes develop a paralysis similar to that of human polio, it was pointed out. And in a few cases of humans who caught Newcastle disease from poultry, the symptoms were somewhat like those of a mild attack of polio.

Brucellosis Protection

Long time protection of cows against brucellosis can be had from vaccination with strain 19 vaccine, Dr. C. A. Manthei of the U. S. Bureau of Animal Industry reported. Brucellosis causes cows to abort. Tests with strain 19 vaccine showed that vaccinated cows had resistance to the disease even after their fifth pregnancy. Brucellosis is a serious problem both for the dairy industry and for humans who can get the disease from infected milk and from handling infected animals.

Thousands of baby foals from Thoroughbred horses will be saved as a result of new, improved tests for handling the Rh baby problem in baby horses. This prediction was made by Dr. W. L. Wallenstein who heads a team of Maryland veterinary researchers.

The fatal jaundice of newborn foals is like that in human babies in that it results when the blood of the father is not compatible with that of the mother. Unlike the human babies with Rh trouble, however, foals usually do not begin to show symptoms until they start to nurse, whereas human babies generally show the symptoms when they are born. This is because the antibodies to the sire's blood, produced in the mare's body, become concentrated in the colostrum, or first milk.

The new tests are designed to show where the trouble is likely to develop. The

foal can then be saved by hand milking the mare for the first day and not allowing the foal to nurse until about 24 to 36 hours after birth.

Shock Death Aid

An extract from the okra plant promises to save pet and farm animals from shock death, Dr. H. B. Benjamin of Milwaukee, Wis., reported at the meeting.

The extract is used as a substitute for animal blood plasma. In laboratory trials, dogs near death from shock quickly recovered when given the okra extract.

In case of atom bombing, there might be many cases of animals as well as humans needing treatment for shock following injuries, it was pointed out. Other times when it would be useful would be following operations, long illness or accidents.

The okra extract is readily available, inexpensive, easily purified and can be stored indefinitely. It is also being studied as a plasma substitute for human beings.

Metal plates, called fracture fixation plates, and Thomas extension splints are helping many animals recover from broken legs. The splints are for small animals and are put on outside the leg but are made so the animal will not entangle them in grass or shrubbery. Successful use of the splints was reported by Dr. J. H. Krichell of Keokuk, Iowa.

The fixation plates, reported by Dr. J. M. Baker of the veterinary staff of Colorado A and M College, are put on internally. Vitallium, tantalum and stainless steel are the metals used.

Atabrine for Fungus

Atabrine, the skin-yellowing anti-malaria drug familiar to thousands of servicemen in World War II, might turn out to be helpful as a remedy for a fungus disease of man and animals.

The disease is called histoplasmosis. It is sometimes fatal. So far no specific cure for it has been discovered. Scientists at Ohio State University in Columbus report that atabrine has shown "some promise" as a treatment in tests with infected mice.

Histoplasmosis has been confused with tuberculosis. It may attack other organs besides the lungs. World center for the disease is the Midwest.

Dogs and other animals also are attacked by the fungus cause, and the Ohio State

scientists believe there may be an animal reservoir. How the disease affects dogs was reported by Dr. C. R. Cole and associates at Ohio State at the meeting of the American Veterinary Medical Association.

Symptoms of the disease in dogs are cough, diarrhea, loss of weight and calcified spots on the lungs. The disease can be spread from dog to dog when they are in the same room.

Other members of the Ohio State research team working on histoplasmosis in man and animals are Dr. Deane M. Chamberlain, veterinary pathologist; two physicians, Dr. John A. Prior of the departments of medicine and preventive medicine, and Dr. Samuel Saslaw of the departments of bacteriology and medicine.

More Meat for Nation

The nation's meat counters would have more liver on them, and probably more beef and lamb, if a leaf-shaped parasite no larger than a pumpkin seed could be conquered. This parasite, the liver fluke, ruins thousands of animal livers each year besides lowering milk and beef production and reducing the quality of meat in infected cattle and sheep. Drs. Edward C. Batte and Leonard E. Swanson of the University of Florida, Gainesville, urged the following three steps for control of the problem: 1. prompt diagnosis; 2. treatment of affected animals with fluke-killing drugs such as hexachloroethane; 3. destruction of snails which harbor the flukes at one stage of their life cycle.

Science News Letter, September 1, 1951

MEDICINE

Outlook "Rather Better" for Multiple Sclerosis Victims

► THE OUTLOOK for patients with multiple sclerosis is "rather better" than is generally assumed, so far as death and disability are concerned.

Figures showing this encouraging situation are reported by Drs. Alexander R. MacLean and Joseph Berkson of the Mayo Clinic. (JOURNAL, AMERICAN MEDICAL ASSOCIATION, Aug. 11).

Multiple sclerosis attacks the central nervous system and may cause impaired eyesight, lack of balance, weakness and numbness and difficulty in speech, among other symptoms.

In a group of 406 patients seen at the Mayo Clinic, the five-year survival rate was 95% of the normal rate and the 10-year survival rate was 85% of the rate for a normal population.

Of 100 patients who were walking and working when first seen, 96 are living and 64 are able to walk and work at the end of five years, and at the end of 10 years 88 are living and 42 are able to work and walk.

Science News Letter, September 1, 1951

MARINE BIOLOGY

Sea Animals Dive at Dawn

Tiny sea plankton that swim and swim but don't get anywhere are teaching scientists some of the secrets of their economically important lives.

► TINY SEA animals which swim and swim but don't get anywhere are helping scientists unfold some of the secrets of their queer behavior in their native habitat.

These tiny sea animals, included in which are minute jelly fish, worms, snails and miniature shrimp, are generally known as plankton and are of great economic importance to man because they provide the food for many of the fish we eat, such as herring, spratt and mackerel.

Scientists have long observed that the plankton, which live in the depths of the sea during the daytime, swim up toward the surface in the evening only to dive back down again with the crack of dawn.

To study the habits of these deep sea divers, two British scientists, Prof. A. C. Hardy and R. Bainbridge, Oxford University zoologists, constructed an ingenious vertical "race-track" for them. A hollow transparent plastic wheel made of three sections of tubing bolted together is filled with sea water through a sealable window and a single plankton is introduced.

The wheel is turned until the plankton is in the vertical portion of the wheel and then one of the scientists sits and cranks the wheel one way or the other in direction and tempo with the swimming plankton. A clever arrangement of automatically swimming gates keeps the water moving with the wheel, so that for all its swimming the poor plankton is always in the same place.

The apparatus is housed in a greenhouse whose lower half is blacked out and whose top half is covered with paper of graded degrees of shading so that, with natural daylight entering a skylight in the roof, a dome of light is achieved which simulates the lighting conditions in the plankton's natural environment.

The scientists have already discovered several interesting facts. For one thing they have found that, contrary to previous assumptions that in the morning the plankton just drop passively back into deeper water, the downward migration is just as actively a swimming maneuver as is the upward evening migration—and just as fast.

They also soon learned that the plankton had remarkable stamina and in the wheel-turning experiments it was always the scientists, not the plankton, who tired first. The longest period of observation so far carried out has been four hours, at the end of which the scientists were exhausted but the tiny plankton, which had been swim-

ming furiously all the time, were as fresh as at the start.

These tiny animals were also observed to move at—for them—tremendous speeds. Calanus, a little shrimp-like animal not quite the size of a grain of rice, can reach speeds of over 100 yards an hour and keep going at 50 yards an hour for an hour at a time. Weight for weight, a man would have to run at hundreds of miles an hour to duplicate this performance.

Prof. Hardy and his colleague hope their studies will throw valuable light on the normal habits of these economically important sea creatures and thus help reach a better understanding of such practical fishing problems as the shoaling of the herring.

To defend their method from the criticism that the plankton in the wheel were artificially confined in that they were limited to up-down movement only, Mr. Bainbridge donned a diving suit and went down into the sea to examine the movements of the animals in their natural state.

He was able to report that, with one or two exceptions, the plankton in the wheel were exhibiting the precise swimming motions of their fellows in the sea.

Science News Letter, September 1, 1951

MEDICINE

Altitude Affects Peoples' Resistance to Disease

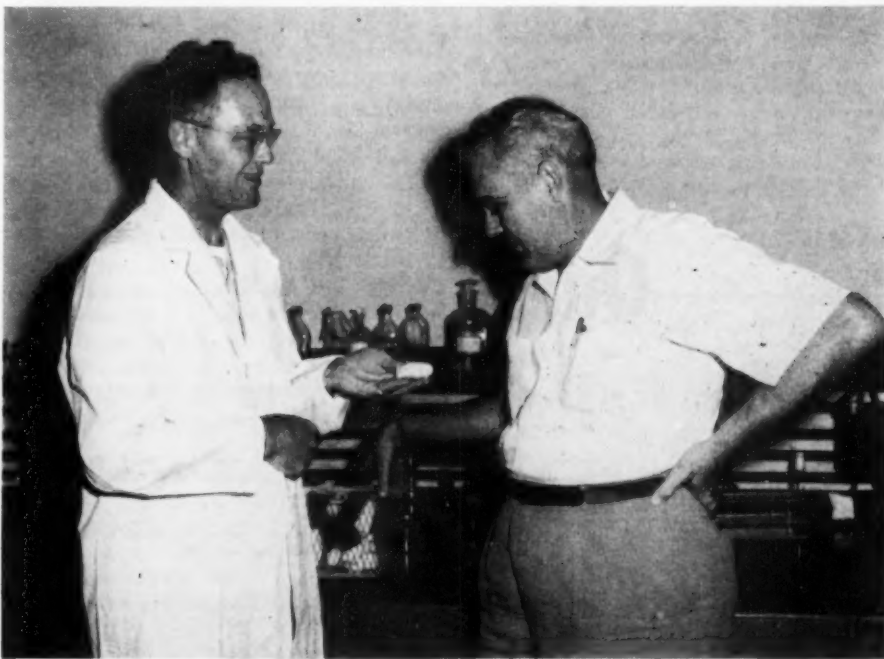
► IF PEOPLE could live at an altitude of 20,000 feet, they might never get pneumonia.

While this may be an impractical way of avoiding pneumonia, the mouse studies suggesting it are expected to give information on the effects of altitudes on disease resistance and susceptibility that will prove useful to high altitude flyers and perhaps to earthbound humans.

The studies are being made at the School of Aviation Medicine, Randolph Field, San Antonio, Tex., by Dr. L. Joe Berry of Bryn Mawr College, Pennsylvania.

Using the altitude chamber at Randolph Field, Dr. Berry has already found that mice accustomed to high altitudes are more resistant to pneumonia but more susceptible to typhoid fever than mice living at ground level altitudes. This effect of altitude may be related to its effect on the number of red cells in the blood. Anemic mice, Dr. Berry found, are more resistant to typhoid than healthy mice. At high altitudes, however, both men and mice get the reverse of anemia, their red blood cells being increased about 50%.

Science News Letter, September 1, 1951



OF MICE AND MEN—Effects of altitude on disease resistance and susceptibility are being studied in mice subjected to various pressures in the altitude chamber at the School of Aviation Medicine, San Antonio, Tex. Dr. Joe E. Berry, left, of Bryn Mawr College, Pa., here shows one of the experimental mice to Dr. Roland B. Mitchell of the aeromedical school.

AGRICULTURE

Bigger Crops Possible

► THE SOUTH can triple its corn crop and get 22 instead of 14 bushels of wheat per acre by higher rates of fertilization and other good farming practices.

The figures for these and other increased crop yields from better fertilization come from a state-by-state survey just completed by the National Soils and Fertilizer Research Committee, headed by Dr. R. Q. Parks, soil scientist of the U. S. Department of Agriculture.

Tobacco growers, the committee found, are getting only about 78% of the land's potential yield, though the tobacco crop is one of those now getting heaviest fertilization. Others receiving heavy fertilization are the vegetable, fruit and nut crops.

Southern farmers now are getting an average yield of 26 bushels of corn per acre.

"A combination of heavier fertilization, the use of adapted hybrids, close spacing,

and other good management practices would triple yields," the committee reports. "This would mean more than a billion additional bushels from approximately 24 million acres, planted in 1949. It would require an estimated 720 thousand tons of nitrogen. Total U. S. consumption of nitrogen in 1949 was a little more than a million tons."

The cotton crop can be increased by about 10% from its present yield of 640 pounds per acre.

The survey reported covered more than 250 million acres in 13 southern states: Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas. Reports are now being compiled on surveys for the Northeast, North Central and Western regions and for the United States as a whole.

Science News Letter, September 1, 1951

METALLURGY

Rare Metal Inspects Alloys

► METAL CASTINGS of light alloys can now be inspected successfully for dangerous defects through use of gamma rays from a rare \$7,000-per-ounce metal irradiated in an atomic furnace.

This major problem of the metallurgical industry was solved by the work of a British atomic scientist, Dr. R. West, of the Atomic Energy Research Establishment, Harwell, England, who announced his discovery to an international meeting of scientists in Oxford, Eng.

The radiography or taking of X-ray-like pictures of aluminum alloy castings has not been possible because the rays from most radioactive elements are too penetrating.

Dr. West uses the rare earth metal, thulium. When irradiated in the Harwell atomic pile it becomes radioactive and then gives off softly penetrating gamma rays which are of the right intensity for making a full detail radiographic picture of a one-half inch aluminum alloy casting.

Radiographs of castings, like X-ray pictures, show the condition of the walls and reveal any structural defects before they have a chance to cause serious trouble in use.

The metal industry has been using radioactive cobalt, tantalum and iridium for taking radiographs of iron and steel pipes, engine blocks and other castings, but the rays from these elements are so penetrating that they are useless for the alloys of the light metals and are even too strong for steel of less than one-half inch thickness.

Radiothulium has a useful half-life of over 100 days.

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Question Box

ASTRONOMY

How much brighter than our sun is the nova just found in the Small Magellanic Cloud? p. 136.

ENGINEERING

What new applications are being found for magnetic fluid used in brakes? p. 137.

MEDICINE

Where would be the best place to live to avoid pneumonia? p. 131.

In what form is cortisone now being given to asthma patients? p. 136.

METALLURGY

How did the Greeks make their official coins? p. 136.

Photographs: Cover and p. 138, Fremont Davis; p. 131, U. S. Air Force; p. 133, Lederle Laboratories; p. 134, University of Illinois; p. 135, Westinghouse Electric Corporation.

METEOROLOGY

With what accuracy can forecasts of rain now be made? p. 134.

PHYSICS

What height and size has been predicted for the first "space station"? p. 135.

PSYCHOLOGY

How could brain waves be used to prevent disasters in industry? p. 142.

PUBLIC HEALTH

What check-ups should children have before starting school? p. 143.

VETERINARY MEDICINE

How may Newcastle disease help polio victims? p. 130.

PARASITOLOGY

Snails Help Fight Disease

Snails housed in special finger-bowl dishes are primary research tools in fight against schistosomiasis, disease that afflicts one-twelfth of world's population.

► **SNAILS ARE** playing a major role in medical science's fight against a disease which infects about one-twelfth of the world's population.

This disease is schistosomiasis. Estimates of its incidence run as high as 144,000,000 people.

There are three types of schistosomiasis, and at least one of them is found in Africa, South America and the Orient. There are areas in Africa and Egypt where 80% of the population suffer from the disease.

Schistosomiasis is a very unpleasant disease. It is caused by tropical worms, known as schistosomes. In humans, the worm eggs often puncture the walls of the veins and arteries, causing leaks in the blood stream. Frequently those afflicted with the disease show pronounced swelling of the abdomen, and there is a high death rate in acute cases.

Similar to most parasitic diseases, schistosomiasis has a cycle of reinfection, going from man to a host and then back to man again. In this case, the middle creature, or host, is a mollusk. The worm parasite passes in feces from man to snails, who in turn infect the water in which they live. Another person will complete the cycle by swimming, drinking or even stepping into the infected water.

Treatment for this disease consists of injections of arsenic and antimony compounds, but these drugs, while effective in some instances, are highly toxic. So the search for something safer and more effective has been under way for several years.

At Lederle Laboratories, Pearl River, N. Y., Dr. Redginal Hewitt and his associates, operate a snail "farm." Over 15,000 of these creatures are raised to provide hosts for schistosomes. Infected snails are kept in special finger-bowl dishes for five weeks in order to allow the embryonic worms to develop. The snails are then isolated in a small amount of water for six or seven hours, where they obligingly shed the young worm parasites. Young white mice are then inoculated with at least 100 worms, and in six to eight weeks the baby worms grow to adult schistosomes. The adult worm is usually about one-eighth of an inch long, although some grow to half an inch. They live in the bloodstream.

The mice are then divided into groups of ten and put into special containers. Dr. Hewitt and his assistants then inject, or administer orally, the various drugs to be tested.

The problems of caring for 15,000 snails are many and varied, Lederle's parasitologist reports. Harmful algae often grow in

their aquariums and kill them. An even temperature must be maintained, their aquariums kept clean and free from dust, and overcrowding must be avoided. Some snails can be used over and over until they die of old age, which is usually eight months to a year.

Feeding is a simple procedure. Small pieces of lettuce are dropped into their watery quarters three times a week.

Snails are bisexual and usually hang their eggs on the sides of the tanks. Under proper heat, eggs hatch in about 12 days. As many as 50 baby snails result from one batch of eggs.

Several years ago Dr. Hewitt and his associates developed Hetrazan, the drug which successfully controls filariasis, or elephantiasis, which affects about 400,000,000 people.

Dr. Hewitt is on a round-the-world tour for field research on these and other parasitic diseases.

Science News Letter, September 1, 1951



SNAIL "FARM" — Special finger-bowl dishes house the more than 15,000 snails used for research to find ways of combatting schistosomiasis, a disease which infects about one-twelfth of the world's population. Dr. Redginal Hewitt of Lederle Laboratories in Pearl River, N. Y., is shown here at work with a few of these snails, hosts for the tropical worms that cause the disease.

NATURAL RESOURCES

Discover Sulfur Deposits

► **THE NEWLY** discovered sulfur deposit in Louisiana, if of sufficient extent, will play an important part in the economy of America and also that of the free world. It will relieve the present world shortage of sulfuric acid, a chemical of first importance in many industrial processes.

The United States produces annually nearly 5,000,000 tons of sulfur, exports much, but utilizes some 3,500,000 tons in this country. It is used in chemicals, fertilizers, insecticides, pulp and paper, explosives, dyes and coal-tar products, rubber, paint and varnish, food products and other materials.

About three-fourths of the sulfur consumed in America is converted into sulfuric acid before entering its ultimate use. By far the largest use of this acid is in making superphosphate fertilizers, an essential in producing enough food to maintain the American people at present standards. American consumption of sulfuric acid in making fertilizer is approaching 4,000,000 tons a year.

The second largest use of this acid is in the manufacture of other chemicals, including explosives needed in war and in industrial activities. Some 2,000,000 tons

are used each year for this purpose. Petroleum refining is the third largest consumer, using over 1,000,000 tons a year. A very important use of sulfuric acid is in the iron and steel industry. Without it, essential steels for national defense and civilian uses would be produced with difficulty.

There are several processes for making sulfuric acid from natural sulfur. In one the sulfur is burned to make sulfur dioxide which is then converted to sulfur trioxide by the addition of oxygen. When the sulfur trioxide is dissolved in water, sulfuric acid results.

The natural sulfur found some 900 feet under the surface of the earth in Louisiana and Texas can not be obtained by ordinary mining methods as it is in other parts of the world. It is obtained by boring holes down into the deposit. In each hole, a pipe is inserted through which superheated steam reaches the sulfur. The steam is hot enough to melt the sulfur, and sulfur-laden water comes to the surface, assisted by high-pressure air also released at the bottom of the borehole.

Science News Letter, September 1, 1951

MEDICINE

Cheap Leprosy Treatment

Trials of DDS, diamino diphenyl sulfone, to start soon in South Africa, will show if it is as good and safe a drug for leprosy as other, more expensive sulfones.

► THE QUESTION of whether DDS is as good and safe a drug for leprosy as some other, more expensive sulfones may be settled through trials soon to be started in the Philippines and South Africa.

DDS is the short name for diamino diphenyl sulfone. First synthesized in 1908, it was considered too toxic to use in human patients until last year. Then, as reported by SCIENCE SERVICE, Dr. John Lowe of the Nigerian Leprosy Service announced good results with a dosage schedule he found did not harm the patients.

Other scientists since then have not gotten the same results. Because the daily cost of treatment with DDS is one-twentieth that of other sulfones, thousands of poor natives afflicted with leprosy could be helped if the drug proves safe and effective.

The new trials, which may settle the matter, will be carried out under the auspices of the Leonard Wood Memorial, Washington, D. C.

Several other sulfones that appear promising for leprosy treatment and also some

drugs used in treatment of tuberculosis which might stop leprosy will be tested, Dr. James A. Doull, medical director of the Leonard Wood Memorial, told SCIENCE SERVICE.

Reason for trying tuberculosis drugs is that the germs causing tuberculosis and leprosy are somewhat alike and what stops one may stop the other. The sulfones, most promising leprosy medicines now, were tried in tuberculosis but were not as effective in this disease as streptomycin and PAS, or para aminosalicylic acid.

Trials of the sulfones and other drugs will be made with the aid of a \$34,085 grant from the U. S. Public Health Service, just announced, in addition to donations of the drugs from the manufacturers and the Leonard Wood Memorial's own funds. The trials will be made at the Westfort Institution near Pretoria, S. Africa, and the Eversley Childs Sanitarium in Cebu, Philippine Islands. Drs. Jose N. Rodriguez and A. R. Davison will be in charge of the tests.

Science News Letter, September 1, 1951



ANCIENT PIPE—Russel C. Fey, of the University of Illinois expedition to northern Arizona, shows a pipe found by the group. The pipe was smoked by a Cohonina Indian about 1,000 years ago and was lost by him when his house burned down. The pipe is painted with a dull black design.

METEOROLOGY

48-Hour Rain Forecasts

► A REMARKABLY better method of predicting whether it will rain two days from now has been developed by U. S. Weather Bureau meteorologists at the Washington airport.

In January, 1951, forecasters predicted wet or dry weather on "the day after tomorrow" with an 89% accuracy. The system used in previous years had achieved only 62% to 70% accuracy. Under the new method, the average for the three winter months last year was 84%.

The system was officially installed last winter and will be used in the Washington-Baltimore area in future winters. Its use will shortly be extended to Kentucky, Tennessee, Ohio and Western Pennsylvania.

Using the fundamental principles on which the new system is based, meteorologists believe the same degree of accuracy can be achieved over the rest of the nation, in winter and in summer. The score is so good for the Washington-Baltimore area that one meteorologist described it as "getting better results than we often do for predicting rain only 24 hours ahead."

The new method is described by R. C. Schmidt of the U. S. Weather Bureau's

station at Washington airport, in the Bureau's MONTHLY WEATHER REVIEW (May). The method is based on a systematic application of the meteorologist's knowledge of the upper air to weather forecasting.

In actual practice as used at the Washington airport, the forecasters depend on information about air pressure high in the air at Little Rock, Ark., and at sea level at Washington. This permitted the forecasters to divide their days into four types. The presence or absence of other weather factors under each of these four types gave the forecasters the basis for making their predictions.

Rain or snow in the Washington-Baltimore area during the winter months almost always depends on whether moisture sucked up into the air from the Gulf of Mexico can travel to the area. This new method gave the forecasters clues as to whether or not this moisture would arrive over Washington and Baltimore under the proper conditions for precipitation—two days after they made their forecast.

Science News Letter, September 1, 1951

ENTOMOLOGY

Cockroaches, Housewife's Nightmare, Test Insecticides

See Front Cover

► THIS NIGHTMARE for the housewife, pictured on the front cover of this week's SCIENCE NEWS LETTER, is a giant cockroach that lives in the southern United States and South America. The facts about its life cycle are not fully known, but P. G. Piquett, entomologist of the U. S. Department of Agriculture at Beltsville, Md., is learning about the habits of this giant insect by breeding them. The one that posed for the photographer has lived under scientific observation for 20 months as an adult. Its mate died after 19½ months as an adult.

Cockroaches are grown under controlled conditions for use as test insects for insecticides and for use in other science studies. This four-inch giant, *Blaberus giganteus*, grows so slowly that it may not be ideal for the routine tests that are made with the ordinary roaches. But it may be of value for other experiments when more is known about it.

Science News Letter, September 1, 1951

● RADIO

Saturday, Sept. 8, 1951, 3:15-3:30 p.m. EDT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Watson Davis, Director of Science Service, will discuss the highlights of the chemical meetings which are being held in New York Sept. 3-15, and which he will cover during the week of September 3-7.

INVENTION

Cheese-Flavored Bread Made Without Cheese

➤ BREAD OR crackers with a pronounced cheese-like flavor, but which may contain no cheese, are made from any of the various types of flour used in leavened bakery goods by the addition of leucine, an essential amino acid, in a conventional dough formula.

The cheese-like flavor may disappear in a few days if crackers are left in an open container. However, if together with the leucine a mild domestic cheese is used in the mix, the flavor will last. Ordinary cheese-flavored bakery products contain expensive, so-called strong cheese.

Peter Kass, Great Neck, N. Y., received patent 2,564,763 for this invention. Interchemical Corporation, New York, has been assigned the patent rights.

Science News Letter, September 1, 1951



SPIRAL STAIR FOR LIGHTNING—Model of a new type lightening arrester, developed by Westinghouse Electric Corporation, which sends a stroke in a spiral down the insulated conductors which angle between the vertical columns. The full size arrester is only half as tall as those formerly used and does not require large structural steel supports.

BACTERIOLOGY

BW Research Neglected

Government not spending enough to find methods of combatting biological warfare, to which U. S. is vulnerable by sabotage, bacteriologist charges.

➤ THE GOVERNMENT is not spending nearly enough on finding out ways to combat biological warfare to which, in terms of sabotage, we would be much more vulnerable than to the A-bomb.

This is the charge of Dr. Walter J. Nungester, president of the Society of American Bacteriologists. In addition, he told SCIENCE SERVICE, too much information which might be useful in protecting ourselves against BW attacks is still being held in secrecy.

"It is not a classified secret," Dr. Nungester said, that there is now no adequate vaccine for brucellosis and tularemia, two diseases which might be used in BW. Yet adequate funds have not been made available to do the work to find and produce an adequate vaccine.

"You cannot bring an A-bomb into this country in your vest pocket," he went on. "Yet it is possible to bring the right cultures inside our borders in small amounts and then an enemy agent could cook up his own home brew of disease almost as was done with real home brew back in prohibition days."

Dr. Nungester said that any "beginning bacteriologist" with the right culture and the right "cookbook" could do the job.

The University of Michigan medical school professor declared that something of the same kind of effort should be put into preparing defenses against BW as is put into A-bomb defense. More funds for research and development, more information disseminated to bacteriologists, and more publicity as to the importance of the problem, were three steps he suggested.

"The enemy might not hit us with the A-bomb, the expected weapon," he pointed out, "but with BW, the surprise weapon."

Dr. Nungester had sent a letter to the Federal Civil Defense Administration, with a copy to the Defense Department, asking that more information be made available to bacteriologists and that more funds be spent on research.

"The answer from Civil Defense was satisfactory," he said, "but they do not have much more information than we have."

He also received a letter from Deputy Secretary of Defense Robert A. Lovett stating that funds for this purpose had been doubled. However, Dr. Nungester did not believe this was yet an amount which would adequately meet the problem.

Science News Letter, September 1, 1951

PHYSICS

Artificial Moon Station

➤ IN NOT so many years to come a giant "doughnut" 200 feet in diameter may be travelling constantly around the earth 1,075 miles up in the sky.

Dr. Wernher von Braun, Army rocket expert, describes such a "space station" in the new book, "SPACE MEDICINE" (See SNL, Aug. 25), edited by Dr. John P. Marburger, research director of the University of Illinois' Aeromedical and Physical Environment Laboratory.

Dr. von Braun is a top German World War II rocket expert, credited with inventing the V-2 rocket, who was brought to this country to work for the Army after the war.

Men will live in the outer rim of the doughnut, according to Dr. von Braun, kept in place by a synthetic "gravity" provided by its rotation slowly around the hub. It can be used to spy on both the earth and the heavens, it can drop bombs on any part of the earth, and can be used as a way station on the road to the moon.

The space station will be made of plastic,

assembled in space by men in pressure suits, Dr. von Braun says. It will have spokes leading to a hub containing a spherical steam boiler. A large silvery disk on top of the hub concentrates solar heat for the boiler. With the steam, according to Dr. von Braun, a turbine may be driven for the generation of electric power.

How does this space station get 1,075 miles up into its orbit? Dr. von Braun believes that it can be carried, broken down into collapsed sections, in a three-stage rocket, which he describes.

"With the tremendous advances recently achieved in aerial defense," declares Dr. von Braun, "it appears to me that in the atomic age the nation which first owns such a bomb-dropping space station might be in a position virtually to control the earth. The political situation being what it is, with the earth divided into a western and an eastern camp, I am convinced that such a station will be the inevitable result of the present race of armaments."

Science News Letter, September 1, 1951

MEDICINE

**Cortisone in Pill Form
Relieves Severe Asthma**

► CORTISONE pills may prove a boon, temporarily at least, for patients with severe, exhausting asthma who cannot be helped by other treatment.

Good results in nine out of 12 such patients are reported by Drs. Sidney Friedlaender and Alex S. Friedlaender of Wayne University College of Medicine, Detroit. (JOURNAL, AMERICAN MEDICAL ASSOCIATION, Aug. 11).

The good effects in asthma of cortisone and ACTH "shots" have already been reported. The pills, or tablets, of cortisone, however, have the advantages of being easier to take and giving quicker relief.

They have the disadvantage, the Detroit doctors warn, of being subject to greater abuse. Patients taking them should be constantly supervised and carefully watched for possible bad side effects of the hormone. The Detroit doctors think the medicine should be restricted to periods of extreme stress when nothing else helps, and that asthma patients should have careful, thorough examinations to determine and remove the cause of the trouble, rather than relying on cortisone.

Science News Letter, September 1, 1951

INVENTION

**Patent Machine to Cut
Tobacco Stalks in Field**

► THE LONG-PRACTICED method of cutting tobacco stalks in the field with hand cutters can be replaced by a machine cutter, a type of a truck with a rotary blade at the front end of the right side of its low platform body. Workmen on the platform gather the stalks as cut and string them on regular drying sticks. The rotary cutter can be adjusted vertically, and means are provided for lifting drooping leaves at the lower end of the stalks.

Inventors are Mark D. Lynn and Russell D. Burkett, both of Columbia, Tenn. Patent 2,560,729 was awarded to them.

Science News Letter, September 1, 1951

PHYSICS

**Sound-Wave Device
Charts Ocean Floor**

► IMPROVED EQUIPMENT of the sound-wave type for measuring the depth of the ocean has been developed by Pennsylvania State College at State College in work for the U. S. Navy in its ordnance research laboratory.

The sound-wave method of measuring the depth of water sends powerful waves through the water to the ocean bed and picks up reflected waves. Elapsed time gives the measurement. This improved device uses what is called a magnetostriction trans-

ducer to send out and receive the sound waves.

The device works on the principle that several metals, including nickel and certain nickel alloys, will contract and expand when a magnetic current is passed through them. The device developed utilizes an iron-nickel core. It gives powerful sound waves through water when an alternating current is used.

An important use for the device is in the location of obstacles under water and the charting of the ocean floor. Commercial fishermen can employ it to locate schools of fish. The new device is claimed to be more compact and efficient than types previously developed.

Science News Letter, September 1, 1951

GENERAL SCIENCE

**Fine Hairs on Filled Piled
Jute Sacks May Spread Fire**

► FINE HAIRS that project from the surfaces of jute sacks filled with materials in storage enable fire to spread rapidly and unnoticed, it has been determined by the British Fire Research Organization.

A lighted cigarette, accidentally coming in contact with the hairs, can start a fire. The path the flame takes into the center of a stack may be almost invisible. Only the fine projecting hair may burn along this path, the fabric of the bag not being even scorched.

However, when the flame meets frayed fabric inside, a smoldering fire is sometimes started. Such fires are sometimes attributed to spontaneous combustion.

Science News Letter, September 1, 1951

METALLURGY

**Official Greek Coins
Plated with Solder**

► ANCIENT Greek coins that were silver-plated were manufactured by use of a silver solder placed upon a copper blank, two University of Manchester metallurgists, F. C. Thompson and A. K. Chatterjee, report in NATURE (July 28).

The plated coins were not counterfeit, but officially issued. Previously it was believed that they received their silver coats by a fusion process similar to that used later in the making of Sheffield silver plate in England.

But the Manchester metallurgists have determined that the Greeks in 300 B.C. carried out the plating of coins by making a shallow silver cup to fit the copper core, lining this with a thin sheet of solder consisting of a silver-copper alloy, inserting the copper core and then covering the combination with another inverted cup similarly lined with solder. Reheating fused core and platings together. The plated blank was then struck hot and formed into a coin.

Science News Letter, September 1, 1951

IN SCIENCE

ASTRONOMY

**Exploding Star Discovered;
Third in Magellanic Galaxy**

► THE THIRD "new star" or nova ever to be found in the Small Magellanic Cloud, nearby galaxy of hundreds of millions of stars, has just been discovered by Karl G. Henize of the University of Michigan's station at Bloemfontein, South Africa.

The exploding new star is temporarily 60,000 times as bright as the sun, but because it is some 80,000 light years away it appears in our heavens as an eleventh magnitude star.

This new star is almost exactly as bright as the novae that appeared in the Small Cloud in 1897 and 1927. Both the Small and Large Magellanic Clouds are so far south they are never seen from the United States. The nova was found on a photograph made Aug. 4, according to a telegram received at Harvard University, clearing house for astronomical information in the western hemisphere.

Science News Letter, September 1, 1951

CHEMISTRY

**Fertilizers' Superphosphate
Is Soon Available to Plants**

► GARDENERS and farmers now have assurance based on atomic evidence that when they add superphosphate fertilizer to their soils the phosphate is very soon available to their plants and crops.

Two Swedish scientists, L. Frederiksson and Olle Gunnarsson, of the Statens Jordbruksforsok, Upsala, proved this by adding radioactive phosphate fertilizer to soil and then dissolving out the water-soluble phosphorus and measuring the proportion of radiophosphorus.

This water-soluble material is the "plant available" phosphorus of the soil and the experimenters found that regardless of the amount of radio-labelled fertilizer they added it was soon thoroughly mixed with the plant available phosphorus and was proportionately extractable.

Plants growing in the treated soil began to take up the radioactive phosphorus of the fertilizer very soon after it was added to the soil and in quantities equivalent to the relative amount of added phosphate.

The results of their experiments led the Swedish investigators to conclude that there is in soil a definite quantity of "plant available" phosphorus, part of which is in the soil solution and part "bound" to the soil colloids but in dynamic equilibrium with the portion in solution.

Science News Letter, September 1, 1951

SCIENCE FIELDS

AERONAUTICS

Safety Plane for Private Flying Slows to 35-Miles

► A SAFER airplane for private flying, demonstrated in Boston, took off and landed repeatedly from a 100-yard runway and made turns at low altitude while traveling at a speed of 35 miles an hour.

The new plane is called the Helio Courier, but it is a plane and not a helicopter. It is an adaptation of an experimental plane, known as the Helioplane, demonstrated two years ago, which was designed by Prof. Otto C. Koppen of Massachusetts Institute of Technology and Dr. Lynn L. Bollinger of Harvard University. Helio Aircraft Corporation, Norwood, Mass., is the builder.

This craft is a high-wing monoplane which uses a geared 260 horsepower engine. Cruising speed is 150 miles an hour. It can carry six people. A particular feature in addition to its safety is the ability to use an in-town small landing field or a landing strip close to a manufacturing plant, handy for the owner's use.

By skillful combination of long-known high-lift wing devices, including large flaps similar to types used on the wings of large airliners, plus a unique control system, the Helio Courier makes it possible to combine the efficient high-speed and payload of the modern executive type plane with low speed landing and short take-off ability.

Science News Letter, September 1, 1951

CHEMISTRY

Home-Made Lard Life Doubled by Shortening

► FARM-MADE lard, rendered in the fall when hogs are butchered, will keep throughout the following summer if any one of several widely used hydrogenated vegetable shortenings (such as Crisco, Spry or Snow-drift) is mixed in it at the time it is being made.

This simple and inexpensive method of retarding rancidity in home-rendered lard was discovered by chemists of the Eastern Regional Research Laboratory of the U. S. Department of Agriculture.

Lard made on the farm late in the fall or in the winter, the usual times for home butchering, keeps well throughout the cold weather but unless kept in a cold place is apt to become rancid in the following summer. By this simple treatment it remains fresh and edible twice as long as it would otherwise.

The use of these commercial vegetable shortenings to preserve lard was discovered by chemists at the laboratory in work aimed

at preventing rancidity in animal fats. Rancidity of fats is a partial chemical decomposition promoted by the oxygen in the air. They discovered that it is prevented by the use of anti-oxidants. Such anti-oxidants are abundant in common vegetable oils such as those obtained from cottonseed, soybean and peanuts.

These anti-oxidants are technically tocopherols. When some tocopherol-rich vegetable oil, hardened by hydrogenation to give proper consistency, is added to lard the protection given by the tocopherols is extended to the lard. One pound of the commercial shortening is sufficient to treat 20 to 25 pounds of lard.

Science News Letter, September 1, 1951

AGRICULTURE

Rose Clover From Turkey Found Superior Forage Crop

► AFTER SEVEN years of trial, one of the most outstanding introductions of forage plants in recent years has proved to be rose clover.

Imported from Turkey in 1944, this winter annual legume is now being planted by farmers and ranchers in many California winter pastures.

As a forage plant rose clover ranked higher than bur or subclover in 14 of 25 plots in various parts of the state, in tests reported by R. Merton Love, professor of agronomy, University of California College of Agriculture at Davis.

Rose clover grows well on poor soils which would otherwise be unsatisfactory as pasture. After a few years growth this plant crowds out most of the undesirable summer weeds. Like all legumes, this plant adds nitrogen to the soil. Many desirable grasses can then enter rose clover seeded areas voluntarily.

This legume shows great promise as a pasture plant in burned off areas. In many places it has done better than bur clover during severe winters. Ample seed is available commercially.

Science News Letter, September 1, 1951

WILDLIFE

Quail Eggs Stand Heat Better Than Pheasants'

► PHEASANTS MAY be less numerous than wild quail in warm areas because of the effect of high temperatures on pheasant eggs.

Studies made by the Illinois Natural History Survey Division of Urbana, Ill., show that pheasant eggs exposed to high temperatures are much less likely to hatch than quail eggs subjected to the same conditions. This may explain why pheasants do not establish themselves in the wild in southern regions whereas quail do.

Science News Letter, September 1, 1951

ENGINEERING

Magnetic Fluid Finding New Applications

► NEW APPLICATIONS for the magnetic fluid used in clutches and brakes, announced by the National Bureau of Standards in 1948, were described to the American Institute of Electrical Engineers meeting in Portland, Ore., by Dwight B. Brede of the University of California's division of electrical engineering.

He reported on investigations he made concerning the use of a magnetic fluid. This fluid is a mixture of finely divided iron and oil that becomes practically a solid when it is between two steel plates, as in an automobile clutch, and the plates are made magnetic by an electric current. It then holds the plates in a unit. When the magnetizing current is cut the iron particles lose their magnetism and the mixture becomes a fluid again.

Several scientists in the country are making investigations to determine the best types of oil and of iron to use in magnetic fluids for various uses. Mr. Brede reported that a mixture of seven parts of a particular carbonyl with one part of a silicone oil provides a magnetic fluid of low residual torque and high magnetic fluid torque.

A magnetic fluid dynamometer is definitely feasible and can be a useful engineering tool, he said. A dynamometer is used to measure the torque of a machine in order to determine its power output. The smoothness of control and the possibility of simple water cooling made the use of a magnetic fluid dynamometer attractive, he said, particularly where lead tests on large motors are being made.

Science News Letter, September 1, 1951

MEDICINE

High Blood Pressure Eye Damage Stopped by Diet

► THE MOST severe disease of the blood vessels of the inner eye disappears partially or completely in the majority of patients treated by the rice diet for high blood pressure, Dr. Walter Kempner of Duke University, founder of the rice diet treatment, reported to a medical meeting held under the auspices of the American Hospital in Paris, France.

The disease of the eye blood vessels causes loss of eyesight to some degree. It has been considered "an irreversible sign of an irreparable disease."

The rice diet, consisting solely of rice, sugar, fruit and fruit juices and two vitamins, is monotonous, Dr. Kempner admits.

Best results with it, he reported, come to those patients who can stick with it for three months or more, because it works slowly. It also helps diabetics, Dr. Kempner reported.

Science News Letter, September 1, 1951

BIOCHEMISTRY

Gay World All Gray to Some

Most of us live in a world of color, but some miss the reds and greens, while others never see yellows and blues. A few see all colors as shades of gray.

By MARTHA G. MORROW

► WE LIVE in a world of color, most of us. Green trees, blue skies, red and green stop-and-go traffic signals, hueful girls—and now even color TV.

But there are a very few of us for whom every color is seen as a shade of gray. For others—as many as 80 men and 5 women in every thousand—the full beauty of reds and greens is never seen. For a few others—one in several thousand—the yellows and blues can never be experienced as bright, pure colors.

You may not realize it if nature is cheating you of a few of the rainbow hues. You may not know that your best friend is color-blind, if he is adept at using intensity to guide his naming of colors.

We are going to learn more about color blindness because scientists here in the United States are creating tests that will tell more about a person's color deficiency than any yet devised.

Until a decade or so ago, there were no widely used American-designed tests for color vision. But recently scientists here in the United States have been designing new ones and improving old favorites. Tiny lights that flash on and off, bits of colored paper mounted in bottle tops, designs hidden amid hundreds of colored dots are all used to spot people who are color deficient.

New Color Test Planned

Today one of the most promising of these new tests for color vision is painstakingly being checked and double checked by color experts throughout the country. This latest U. S. test-in-the-making, to be released for general use within another year or two, is designed to show both the nature and extent of the color deficiency.

The ability to see colors instantly and accurately is necessary for many jobs. Color matchers and dyers, and paint mixers must be adept at noticing small color differences. Railroad and marine engineers, airplane pilots and ship lookouts must recognize distant colored lights so they may act instantly upon the signal. The work of laboratory technicians and chemists often depends on color.

Late some moonless night, when lights have been turned out, go outdoors and look around. If the illumination is low enough, the house and its surroundings will be seen in various shades of gray. You will not be able to tell whether the trees have green or brown leaves, or whether your sweater

is red or blue. This gray scene illustrates the kind of world that a totally colorblind person sees—black, white and gradations of gray.

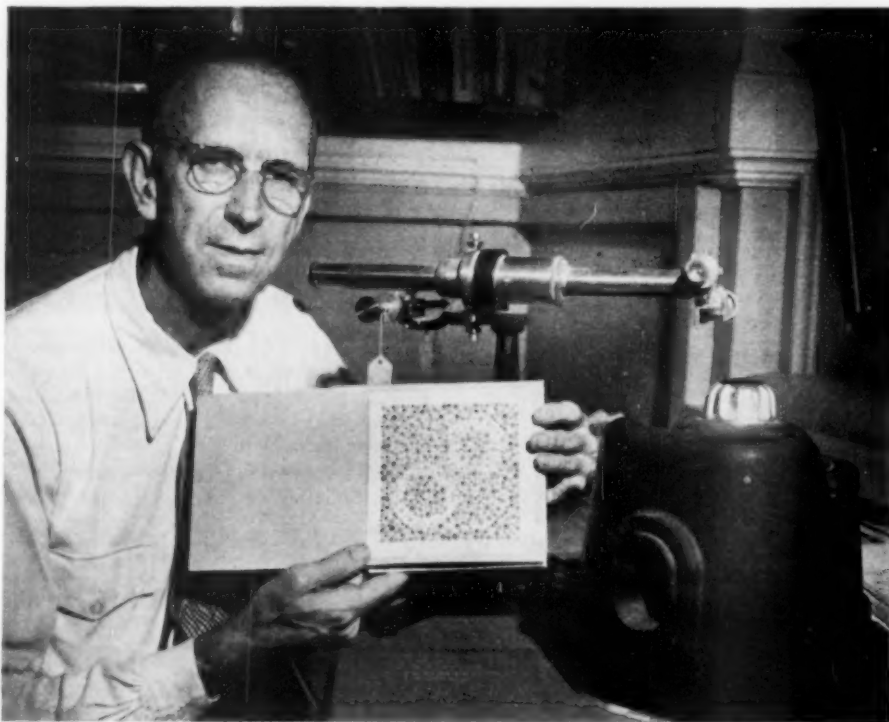
People who are red-green deficient may find it difficult to pick ripe strawberries, currants or cherries against a background of green leaves. They may sometimes be caught wearing one green and one tan sock. Some of them actually confuse black and red ink in balancing their budget!

A simple but tricky new gadget that immediately shows which colors are confused by the different types of color defectives has just been created by Lt. Comdr. Dean Farnsworth of the Navy's Medical Research Laboratory at the New London Submarine Base. On it a person who is extremely color deficient will match a gray spot on a trans-

parent disk with a red, violet or green spot on a master diagram beneath. Others, not quite so color deficient, will say the gray doesn't really match any of the spots, but looks nearer to one than the others. Immediately the device indicates which colors an observer confuses.

A number of ingenious methods have been used to detect color blindness. Probably the oldest still in use today and one of the simplest is the wool sorting test. Developed by Frithiof Holmgren following a shocking railway disaster in Sweden in 1875, it was designed to eliminate dangerously colorblind railway engineers and trackmen.

In this test skeins of colored yarn of many hues and shades are to be sorted into groups as they resemble three standard skeins—yellowish green, pale rose or purple, and a vivid red. Incorrect sorting shows up the color defective. Only about half of the colorblinds among those tested, however, and not necessarily those with the greatest color deficiency, are detected by such a test.



COLOR TEST—People who cannot see colors will not spot the figures on the card which the camera picked up through the use of a yellow filter. The designs are formed of colored dots against a background of gray dots in this Hardy-Rand-Rittler plate. Dr. Deane B. Judd of the National Bureau of Standards is holding the book of plates which he and other color experts through the country are now testing. The squatty New London U. S. Navy Lantern and the tube-like Anomoloscope, also used in testing color vision, are shown in this photo.

Although a favorite for many decades, today the wool-matching test is little used. But the Dichotomous test developed by Comdr. Farnsworth, using circles of colored paper mounted in small black bottle tops, is an industrial test of the same sort in up-to-date and soil-resisting clothing.

Today the "hidden digit" test is perhaps the one most frequently used. This consists of a book of charts or plates, each plate containing numbers made up of spots of color set in a background of spots of the color with which the first color is often confused. Thus the number which is easily seen by the normal subject is hidden for the color deficient who falsely sees number and background as the same color.

The hidden digit test was originally designed by J. Stilling in Germany about 1878. Several decades ago Dr. Shinobu Ishihara, professor at the Imperial University in Tokyo, devised a similar test. In many of the Ishihara plates one number is seen by people of normal vision, another by color-deficients.

In order that the hidden-digit tests would be available in the United States during World War II, a U. S. edition was published. This included 46 plates, some from Stilling, some from Ishihara. Printed by the Beck Engraving Co., Inc., for the American Optical Company as distributors, this is the United States' first widely used printed tests—the A.O. test of World War II.

War Brought New Test

During the war extensive tests showed that a suitable selection of a few of these plates would do the work of double or triple that number. So on the advice of the color blindness subcommittee of the Inter-Society Color Council, composed of the country's leading experts in this field, a revised 19-plate edition of the American Optical Company's "Pseudo-Isochromatic Plates for Testing Color Perception" was issued and is still in wide use.

But now superior tests are being devised. Drs. LeGrand H. Hardy, Gertrude Rand and M. Catherine Rittler of the Ophthalmological Institute of the College of Physicians and Surgeons of Columbia University have recently sent copies of their hidden-design test to color experts throughout the country for validation. This test is designed to give more information than any previous test of this type.

Anyone who correctly names the figures on the first half dozen plates is pretty sure to have good color vision. Using the colors most likely to be confused with gray in graded steps of chroma from faint to strong, the test indicates several degrees of color deficiency as well as showing the type of color deficiency present.

In this test the hundreds of dots on each chart are arranged in exactly the same pattern. Thus no external clue is given which the color deficient, who fails to spot the figures made by the colored dots against the background of gray dots, can memorize.

Instead of using numbers, the Hardy-Rand-Rittler test uses colored triangles, circles and squares so that a young child who has not yet learned his numbers, or an illiterate person, can take the test.

The lantern test, one of the earliest types designed but under constant improvement, is favored by railroad engineers, airplane navigators and submarine lookouts as more in line with their daily tasks. The New London U. S. Naval Lantern test is designed to weed out the 6% of men with color vision unserviceable for civil aeronautics and naval service.

Tiny spots of red, green and white are flashed on and off, two at a time, in this lantern test. Trick feature is that some of the whites, greens and reds are more intense than others. Thus intensity of the light, often used by color defectives to elude the purpose of a test and thus pass it, is made the means of detecting defective color vision.

Traffic Lights Off-Color

Standard stop-and-go traffic lights are made blue-green and orange-red to help the color defectives distinguish them. In addition, the green, red and amber lights all differ in intensity. Intensity and their position give added hints as to their color. Colorblind people, on the other hand, have difficulty distinguishing between red and green lanterns used to control traffic when road repair is in progress, and sometimes confuse port and starboard lights on ships and airplanes.

Basic research that will make future tests easier to design and more reliable in performance has recently been completed by Dr. Deane B. Judd of the National Bureau of Standards. Concerned more with what the colorblind person sees than with the mistakes he makes, Dr. Judd has worked out in detail for the whole gamut of the Munsell Book of Color just how 400 of these colors look to colorblind individuals. About three dozen people with unmatched eyes, some of them having one normal eye and the other colorblind, furnished the basic data on which he worked.

Even better tests are promised for the future. Our knowledge of color vision has greatly expanded within the past few decades. Much fundamental study has now been completed. And the country's top color experts have shown themselves ready and willing to cooperate by checking, experimenting and advising on new tests.

A kit containing a "hidden digit" test; a trick new gadget (in unassembled form) designed to show which colors are confused by extreme color defectives; and four colored dots selected to show that everyone is slightly blue-yellow blind has been assembled for you by Science Service. It is available for the nominal price of 75 cents. Just write Science Service, 1719 N. St., N. W., Washington 6, D. C., and ask for the Color Vision kit.

Science News Letter, September 1, 1951

INVENTION

Playing Card Holder Gets U. S. Patent

► THE CLUMSY cardplayer who has difficulty in holding his cards with fingers and thumb in the usual fan-like position is relieved of the task with a playing card holder on which the government has recently issued a patent.

It is an arched-shaped affair, with a T handle projecting downward. Cards are stuck in slots on the outer and upper edge of the arch. When they are in place, the whole resembles a fan. Cards are easily visible to the player, and are removed, one by one, so easily that they are less stained, worn or damaged than when handled in the conventional way.

Patent 2,564,315 was awarded to Henry L. Stark and Khattar Ead, Brooklyn, N. Y., for this invention. The holder can be cheaply made of paper, wood, plastics or metal.

Science News Letter, September 1, 1951

YOU DON'T HAVE TO BE RICH TO RETIRE

Here's How to Enjoy Life!

Amazing, New Book Tells
You Where It Costs Less to Live

Many people spend a lifetime trying to find a place where they can retire and begin to enjoy life. Others think that only the very rich can retire from the ulcers, pressure and the hectic pace of modern business. In this country alone there are hundreds of communities where it costs less to live, where you can earn extra income through your hobby, seasonal work or part time work. You don't have to be rich to retire young—you just have to know where.

"Where To Retire On a Small Income"

Names the Places and Shows You:

1. where you can go fishing, hunting, boating and swimming practically from your front door.
2. where living costs, food costs, rents and real estate are low.
3. where you can buy a farm for only \$2,500.
4. where your hobby can bring you a good income.
5. where you can live the life you've always wanted.

Pathfinder Magazine Says, "Should be one of the season's most popular books".

This sensational book covers cities, towns and farms from New England to California, from the Pacific Northwest to Florida, where you don't have to be rich to retire. It includes Hawaii, Puerto Rico and the Virgin Islands. Now you can find many communities where you can begin to enjoy life. Why wait till you're too old to enjoy retirement when you can retire now? If you say, "I can't afford to retire", this book will prove to your own satisfaction that you can. Act now! You risk nothing. We're so sure the American public has wanted a book like this that we give you a Money-Back Guarantee if not completely satisfied. Simply tear out this ad, print name and address and mail with \$1.00 to Harlan Publications, 4 Third Avenue, Greenlawn, New York.

BIOLOGY

NATURE RAMBLINGS



Cocoons

► THE SEASON has arrived when children become interested in cocoons. They bring these familiar fall and winter fruits into the schoolroom on the twigs where they have found them, or even better, they capture late-feeding caterpillars (the bigger and fatter the better) and keep them captive until they decide to spin themselves in for the winter.

The spinning of the cocoon by a caterpillar, and the strange process that goes on inside it, whereby through a death-like sleep the unlovely and wingless worm acquires wide pinions and shimmering colors, was a great mystery to the ancients, and indeed is pretty much of a mystery still. This strange long sleep of the caterpillar-becoming-a-moth is one of the most outstanding facts of natural history, and yet, in spite of all the attention that has been bestowed upon it, one of the least understood.

In one way, the spun-in larva is as though dead, for it can not be aroused from its

sleep even if the silken cover is cut away and all sorts of rough stimuli applied. But this dormancy is not torpor. The creature is most intensely alive, and except when the temperature is at freezing, all sorts of changes in bodily structure are vigorously taking place.

If we cut open a cocoon we shall find inside neither caterpillar nor moth, but a brown, varnished-looking chrysalis, that looks more like the mummy of an insect than like the half-way station from grubhood to glory. The caterpillar, or larva, has become a chrysalis, or pupa. The gross, soft bulk of the larval body has condensed, hardened and shrunk into the brown, tough, apparently dead creature that looks like a half-finished insect, partly baked and then tossed aside as not good. It is a half-finished insect, but by no means tossed aside. Folded up in this brown lump are all things necessary for full existence as an adult insect, and within that unprepossessing brown case further changes are taking place.

The head is well marked, with the projections for the eyes on either side and a bulge in front where the coiled tongue will be. The legs are very distinct indeed, folded closely across the chest. It is a little difficult to figure out how the large, flat, stiff wings can get out of the two small back-packs; but whoever has ever seen a butterfly emerge from its cradle will remember that the wings are all soft and rumped at first, like wet paper. The extension and stiffening come later.

Not all caterpillars spin complete cocoons. Many of them can be found as chrysalises in mere scanty webs that hardly conceal them, and some kinds hang totally naked by a single thread.

All the gorgeous costume of the mature moth is being fabricated out of the stored-up material which the gluttonous caterpillar stuffed into itself during its long summer feast.

Science News Letter, September 1, 1951

BIOLOGY

Radioactive Atoms Show Food Moving in Sugar Cane

► THROUGH THE use of radioactive carbon dioxide, scientists at the Hawaiian Sugar Planters' Association Experiment Station in Honolulu have been able to trace the movement of food through sugar-cane plants.

The radioactive material was fed to a single leaf and its progress through the plant was checked with Geiger counters.

Within 20 hours after feeding, food manufactured by this leaf was found to have moved to blades in other stalks of the plant. In 44 hours, 94% of the material had left the blade from which it had originated. All but three per cent had moved out within eight days.

Although the greatest amount of material had moved to the stalk immediately below the joint to which the test blade was attached, some had found its way to old joints. This disproves the theory that active storage takes place only in joints to which leaves are attached.

It was also found that different stalks within the plant received varying amounts of the food manufactured in the test leaf. The variation was not related to the size of the stalk, indicating, according to the experimenters, "that there must be some internal physiological factors determining distribution."

On the basis of these experiments, it is estimated that the minimum rate of movement of food within the plant is about 1½ feet per hour.

Experimentation with the radioactive carbon, obtained from Oak Ridge, was begun several years ago. Earlier tests proved that green leaves can form cane sugar by adding together the two simple sugars, glucose and fructose.

Science News Letter, September 1, 1951

Tungsten-Mercury-Uranium!

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NUTRITION

Probe Odd-Shaped Eggs

► WHAT CAUSES all those crazy-shaped, odd-sized eggs the farmers can't sell? Is it heredity, handling, temperature, humidity—or some factor not yet known?

That's what poultry experts at the University of California are trying to find out.

Investigations to date indicate that abnormal eggs often follow certain diseases but sometimes the cause of egg damage can't be determined. Some of the eggs show severe reduction in size, odd shapes, thin, rough or wrinkled shells, abnormal air cells or free-floating air bubbles, completely watery egg white and egg white containing floating whitish particles.

Some birds lay eggs with only one or two of these defects, while the eggs from others may show most of these characteristics. The duration of damage varies also.

The damaged eggs may be so poor in quality and grade that they have little market value, though actually they are satisfactory for human consumption.

Egg damage is known to occur in flocks after recovery from pneumoencephalitis (Newcastle disease). This is true also following the use of certain vaccines. However, this is true only if the infection or vaccination occurred when the flock was in production.

Damage also has been observed to occur following infectious bronchitis in a laying flock. Severe damage to egg quality also has followed an attack of coryza, another respiratory disease, and also seems to occur when there is no history of respiratory disease of any sort.

Science News Letter, September 1, 1951

TECHNOLOGY

High-Power Auto Engines

► **MOTOR VEHICLE** engines now in production, some for both civilian and military uses, others for military only, are claimed to be greatly superior to older types, giving higher power, greater fuel economy and longer life in service.

One is a diesel engine revealed by General Motors which is designed to power trucks and is called the "Million-Miler" because it is good for a million miles in highway service. Others are products of Continental Motors Corporation and are intended for use in military tanks and in Air Force ground installations.

Two Million-Milers are being built. One is a four-cylinder 150-horsepower type to replace former 133-horsepower engines. The other is a six-cylinder 225-horsepower unit, a step-up of 25 horsepower over the engine it replaces. Although horsepower has been increased, a highly important fuel economy has been effected.

This economy is due to a fuel modulator which automatically feeds exactly the right amount of fuel and air for maximum efficiency regardless of throttle position. The modulator is incorporated in a new gov-

ernor assembly. Acting like a mechanical brain, it exerts its modulating effect at speeds below 1,500 revolutions per minute where drivers are apt to waste fuel by using an uneconomical gear.

Important in the Continental production is a new line of air-cooled engines, two of which are already in use by the Air Force in ground installations. The engines can be started in temperatures as low as 65 degrees below zero Fahrenheit and have a range of power from 15 to 250 horsepower. They are military adaptations of certain models of Continental's airplane engines. They are built with two, four, six or eight cylinders.

A unique feature of these engines is a load-sensing governor which operates in accordance with speed changes and pressure to increase or decrease engine speed automatically as the applied load changes. For starting at low temperatures, the engines are pre-warmed by a self-contained system which burns gasoline. A blower drives the heated air through the crankcase and over the cylinders.

Science News Letter, September 1, 1951

PSYCHIATRY

Love Prevents Breakdowns

► **OLD PEOPLE** need to feel loved and wanted, just as do children, or for that matter, persons of any age. The need is more acute at the extremes of life, perhaps because the very small child and the very old person are both to a large extent physically dependent on others. And just as children learn more quickly to tie their shoe laces and help with the dishes if mother shows confidence in their ability, so many old persons can do more if someone shows confidence in their ability.

These two feelings, love and confidence in their possibilities for improvement, have helped many senile patients in Topeka State

Hospital in Kansas to recover and go home to useful lives, though they had previously been considered hopeless senile mental patients. Their story is told by Dr. Walter Woods, resident psychiatrist in the hospital, in the *MENNINGER QUARTERLY*, published by the Menninger Foundation.

"One man of 90 developed an interest in carpentry, music and painting," Dr. Woods relates. "Another, 87 years old, aided by a new hearing device and an artificial leg, now walks to a favorite shaded spot on the hospital grounds to study his self-taught shorthand and Spanish grammar. A 78-year-old patient, blind for many years, has learned to walk unaided to the piano for his lessons in boogie-woogie. Still another 78-year-old will go home this month, as others have done before him; he will keep books to help his son with the operation of his farm."

The breakdowns of elderly people which can be prevented, Dr. Woods states. The old people can be helped to accept their limitations and to develop new skills within the range of their capabilities. Community planning is needed, and it should be the kind that lets the old person "live his last years in the same place and with the same people with whom he has spent his life."

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"Planning for the aged is planning for ourselves," Dr. Woods warns. "Three of every 10 of us born 50 years ago could expect to live to be 70. Today the figure is five out of 10, and going up."

Science News Letter, September 1, 1951

INVENTION

Sunlamp Phosphor Coats Fluorescent Lamp Tube

► A **SUNLAMP** phosphor to use for coating the inside of the tube of a fluorescent lamp was awarded patent 2,563,901, issued to Rudolph Nagy and Robert W. Wollentin, Bloomfield, N. J. Westinghouse Electric Corporation, East Pittsburgh, Pa., has acquired the patent rights.

The particular object of the invention is to produce an efficient phosphor whose peak of emission is near that of the erythema spectrum, the portion that emits the radiation required in a sunlamp. It gives only a small output of visible radiations. In the preparation of the phosphor, there is produced a solid solution of magnesium and calcium ortho phosphates activated with thallium.

Science News Letter, September 1, 1951

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PSYCHOLOGY

Brain Waves for Safety

► USE of brain wave recordings to prevent disaster in industry at both employee and management levels is urged in a report to the American Medical Association.

Reporting in the ARCHIVES OF INDUSTRIAL HYGIENE AND OCCUPATIONAL MEDICINE, Drs. Joseph L. Fetterman and Victor M. Victoroff, psychiatrists-neurologists at the Fetterman Clinic, Cleveland, state:

"It would be well if it were possible to determine the potential lapses in memory, judgment and consciousness which might endanger the lives and property of others."

Railroad engineers, airplane pilots, control tower operators, cab, truck and bus drivers, workers in deep sea diving, deep mining, caisson work and tunnel building are among the examples cited.

Whether lack of sleep will so seriously harm brain functioning in valued personnel as to risk accident and reduce output may be determined with the aid of brain wave records.

Persons who cannot safely work overtime might be screened by this method.

Brain wave records give a more useful test than electrocardiograms, or heart wave

records, of the directors of large businesses and industry, the Cleveland physicians state. This is because it might pick up signs of unnoticed damage to the brain, "little strokes" that might not otherwise be recognized though they could impair mental efficiency.

Science News Letter, September 1, 1951

HORTICULTURE

New Hybrid Sweet Corn Getting Final Test

► NEW HYBRID sweet corn is being given its final test—an OK from the housewife this summer in New Jersey. If it passes, large-scale production of the variety, known as N. J. 101, is expected.

Consumer reaction to the hybrid, developed by Dr. Robert Snell of the New Jersey Agricultural Experiment Station in New Brunswick is being weighed in several New Jersey stores.

How fast it moves off the display bins is being judged. Housewives are being given cards which they are being asked to fill out after they have served the corn to their families, noting their reactions.

Science News Letter, September 1, 1951

PSYCHOLOGY

Intelligence Raised When Half of Brain Removed

► HALF A brain is better than one whole brain, O. L. Zangwill, of the Institute of Experimental Psychology in London has found.

Children who had half of each of their brains removed at the National Hospital in London in an attempt to cure them of epilepsy and other mental disorders astounded the doctors with their post-operation intelligence level.

It had been thought that removal of half a brain caused a lowering of intelligence, instead of which the children at the National Hospital were, if anything, more intelligent after the operation than they were before.

Science News Letter, September 1, 1951

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publication direct from issuing organizations.

THE ADOLESCENT PERIOD: A GRAPHIC ATLAS—Frank K. Shuttleworth—*Child Development Publications*, illus., paper, \$3.00. 453 charts concerning adolescents including physical growth, intelligence, behavior maladjustments, occupation adjustments, sex adjustments, etc.

COLOR ATLAS OF MORPHOLOGIC HEMATOLOGY WITH A GUIDE TO CLINICAL INTERPRETATION—Geneva A. Daland—*Harvard University Press*, 74 p., illus., \$5.00. A reference guide for distinguishing the anemias, the leukemias, infectious mononucleosis and physiologic changes in the peripheral blood.

THE CRISIS IN HUMAN AFFAIRS—J. G. Bennett—*Hermitage House*, 239 p., \$2.75. Philosophical comments by a British scientist.

INSECT CONTROL BY CHEMICALS—A. W. A. Brown—*Wiley*, 817 p., illus., \$12.50. For chemists and those interested in large scale use of insecticides.

LIFE IN A MEXICAN VILLAGE: Tepoztlan Re-studied—Oscar Lewis—*University of Illinois Press*, 512 p., illus., \$7.50. An anthropological re-survey of this Mexican village reveals that a sewing machine-radio-cola-drink culture now competes with superstition and primitive beliefs. Excellent drawings by Alberto Beltran.

MATERIALS AND METHODS IN THE STUDY OF PROTOZOA—Harold Kirby—*University of California Press*, 72 p., paper, \$2.50. A laboratory manual to aid in the securing, maintaining and making preparations of protozoa for observation.

POSITIVISM: A Study in Human Understanding—Richard von Mises—*Harvard University Press*, 404 p., \$6.00. Explains how the scientist's striving for clarity, sincerity, and objectivity should be carried over to all of man's intellectual endeavors. Translated from German.

PRINCIPLES OF ELECTRICAL ENGINEERING—William H. Timbie and Vannevar Bush—*Wiley*, 4th ed., 626 p., illus., \$6.50. The principles basic to modern electrical engineering, electronics and radar.

RADIOLOGY OF THE TEETH AND JAWS: Including Dental Radiography for Students and Practitioners of Dental Surgery and Radiology—Frank L. Ingram—*Williams and Wilkins*, 160 p., illus., \$3.50. X-ray photographs and text illustrating the processes of pathology in tooth and bone.

SOUTHEAST ASIA—E. H. G. Dobby—*Wiley*, 415 p., illus., \$5.00. On the physical and human geography of Malaya, Burma, Indonesia, Indochina, Siam, and the Philippines, and posing some of their present problems.

STEEL TRAILS TO SANTA FE—L. L. Waters—*University of Kansas Press*, 500 p., illus., \$4.00. A history of the Santa Fe Railroad, its growth and impact on the peoples of the Southwest.

THIRTY-FOURTH ANNUAL REPORT OF THE NATIONAL RESEARCH COUNCIL OF CANADA, 1950-1951—*National Research Council of Canada*, 44 p., paper, free upon request to Canadian Scientific Office, 1800 K Street, N. W., Washington 6, D. C.

Science News Letter, September 1, 1951

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PUBLIC HEALTH

Pre-School Check-Up

General health, and particularly eyes, ears and teeth should be checked by doctors before fall school season. Behavior defects should be corrected.

➤ JUNIOR, aged six, is ready to start school for the first time this month. He has a new pencil and a new tablet or copy-book and probably a pair of shiny new shoes. If his parents are wise he has also had a health check-up with the family doctor or his own pediatrician (child specialist).

When children start school is the time they start "catching" measles, whooping cough and other childhood diseases. They can be protected from many of these ailments and the family doctor or pediatrician will advise about this.

Every child should be vaccinated against smallpox before entering school, and he can be protected against whooping cough, diphtheria and tetanus, or lockjaw. Most doctors advise giving these protective treatments before the child is one year old, but if that has not been done, Junior should be taken to the doctor for them now.

When the doctor gives Junior his pre-school check-up, he will look for such signs of health as bright eyes, rosy cheeks, firm muscles and an erect posture. He will examine heart and lungs, nose and throat. He will ask whether Junior has been gaining steadily in weight and growing in height.

Junior may be smaller than other boys his age and still be perfectly healthy. There is a great difference between children in this respect, but it is important that each child show a steady gain.

If Junior's posture is poor, the doctor may ask what he eats and how much he sleeps. A child may slump instead of standing straight because he is a little tired or is undernourished. In a young child the defect in posture can usually be corrected by such simple measures as plenty of sleep, proper food and exercises to strengthen and by teaching the child how to use his muscles.

Healthy Eyes, Ears

If a child has trouble seeing the blackboard, if the letters in his reading book are blurred, if he cannot hear the teacher or if he has a toothache, he cannot be expected to learn and bring home good marks from school. Yet many children start school suffering from such a handicap, often not knowing themselves what the trouble is.

Sometimes the child will complain of headache or hurting eyes, or the teacher will be quick about detecting the trouble. The wisest course, however, is to have the child's eyes examined by a qualified eye doctor before he starts to school. If there are any defects, he can be given glasses to

correct them, and will not have any handicap to his progress in learning.

Poor hearing is another condition that often makes children seem backward and dull. In some schools hearing tests are given to all the children. You can make sure that your child will not get off to a bad start through poor hearing by having his own doctor make the test.

If there is any defect, the doctor will advise about putting him in a special class and having him learn lip-reading to make up for the defect. The steps to be taken will depend on the extent of hearing defect or loss.

When Junior and Sister are ready to start school, they probably have acquired their six-year molars. These are the first and most important of the permanent teeth and should be carefully watched and any cavities filled promptly, so that these important grinders will last throughout Junior's or Sister's life.

A visit to the dentist before starting school is therefore in order, unless the children are already making regular visits for a check on the health of their teeth. They will begin to lose their baby teeth soon after starting school, but these should not be lost prematurely through decay because they are needed to keep the mouth in the right shape for the permanent teeth.

Behavior Defects

By the time a child starts to school, his parents should have him well on the road to good behavior. This is not just a matter of obedience, though many parents seem to expect the school to make over the youngster and enforce the discipline they have neglected.

The overly docile child who always obeys but has no playmates and no interest in games is suffering from a behavior defect as is the extremely sullen, unruly youngster or the one given to temper tantrums.

Such abnormal behavior is a sign of emotional difficulty that needs correcting just as much as poor eyesight or impaired hearing. If the trouble is deepseated and serious, school routine and discipline are not likely to correct it. Instead, the child may turn truant from school and get into trouble that might bring him into the courts.

Much of the responsibility for the child's ability to handle emotional problems, or lack of such ability, rests on the parents, the way they train him during his early years, and the home environment they provide for him. Schools also have some responsibility

in seeing that the needs of the child, especially the teen-age child, are met.

The child from a home shadowed by misery and destitution may go to school hungry in body and insecure and fearful in his mental and emotional life. Even if his home is good in a material way, it may not provide him with a feeling of security and an opportunity to develop his self-confidence. The child who is over-protected by too anxious parents, or neglected by too busy ones, or misunderstood by parents who are careless of his needs may have serious difficulty in adjusting at school.

Scolding, punishments, stricter discipline at home or in school will only make matters worse. Instead, the child should be taken to a doctor or guidance clinic to have the cause of the trouble discovered and corrected.

Science News Letter, September 1, 1951

GENERAL SCIENCE

Scientists Mobilize to Save Science Foundation

➤ THE NATION'S scientists, engineers and technicians are being mobilized to try to save the National Science Foundation.

More than 225 scientific societies have received urgent requests from the American Association for the Advancement of Science—top American scientific body—for action in trying to restore the 98% cut in funds for the NSF made recently by the House of Representatives.

The House reduced the appropriation for fiscal year 1952 from \$14,000,000 to \$300,000. Whether the cut will be restored depends on the Senate Appropriations Committee which is expected to act soon.

The money cut out by the House was designed to pay for aid in fundamental research and fellowships to young scientists.

Dr. Howard Meyerhoff, executive secretary of the AAAS, in announcing this mobilization of scientists, declared that the action of the House was "shortsighted and detrimental to the security of the nation."

He said that "we are desperately short of trained scientists and we have about used up our stock of fundamental scientific knowledge. We must remain out in front of the Soviet Union in technological developments. The \$13,700,000 denied to the National Science Foundation by the House was designed to help us do this."

Scientific organizations will be urged to make known to Senators the need to the nation of the two programs of the NSF. In addition, college presidents, particularly of technical and engineering institutions, are expected to ask the Senate to restore the cut.

Science News Letter, September 1, 1951

Over 1,000,000 pounds of rice have been contributed by Brazil to children of India.

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N ST., Washington 6, D. C. and ask for Gadget Bulletin 585. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

☼ **COASTERS** for the table, to hold glasses of beverage, have a base of wood impregnated with phenolic resin and a rim of heavy silver plate. The impregnated wood has all the natural beauty of the original material, and is highly resistant to water, alcohol and chemicals.

Science News Letter, September 1, 1951

☼ **DYNEL SOCKS** for men, to be available soon, are made of a synthetic fiber, will not shrink or stretch and are easily washed. They will be available for business or dress wear and are said to combine good looks with long wear and easy maintenance.

Science News Letter, September 1, 1951

☼ **VINYLLITE PLASTIC** sheeting, to keep a baby on the rear seat of a car from rolling off and also to protect the seat itself, is fashioned to fit the seat and extend upward at the front to fasten to window frames. Being transparent, the sleeping baby is always visible.

Science News Letter, September 1, 1951

Do You Know?

Not all tea used in the United States comes from Asiatic areas; last year this country imported over 500,000 pounds of tea from Brazil.

The first pure nickel was prepared in 1804.

The modern napalm bomb, designed to drop from aircraft to start fires in enemy installations, contains a silica aerogel in addition to the gasoline and aluminum soap thickener in earlier bombs.

The usual football is a rubber bladder covered with cowhide and is not a "pig-skin."

Ascorbic acid, available in drug stores, is recommended to housewives freezing fruit for preservation to prevent darkening and loss of flavor.

The oldest commercial oil well in Iran is now 49 years of age.

Increasing compression ratio in the automobile engine means increasing the pressure at which the fuel is burned in the combustion cylinder.

Dairy cows on pasture graze about 7.5 hours a day.



☼ **FLUTE** for the youngster made of plastic materials is tunable to the piano by a turn on the mouthpiece. Practically unbreakable, it features clear tone, full chromatic scale and easy fingering. The instrument, illustrated in the accompanying photograph, can be washed in warm water and soap without damage to resonance or finish.

Science News Letter, September 1, 1951

☼ **BED** for the long-haul truck driver, recently patented, is a convertible affair to

form a passenger seat when not wanted for sleeping. It is for use in a cab with a compartment extending out under the hood to accommodate the feet of the person using the bed.

Science News Letter, September 1, 1951

☼ **GLASSWARE WASHER** for chemical laboratories will thoroughly clean all glass utensils from pipettes to flasks in a relatively short period. Inside the enameled box is a vertical wheel which holds baskets for the glassware on its rim. Revolving slowly by electric power it dunks and redunks the utensils.

Science News Letter, September 1, 1951

☼ **TEMPERING VALVE** to insert in a hot water pipe line is fixed at the factory to deliver water to faucets or plumbing fixtures at a temperature no higher than 140 degrees Fahrenheit. One use is with dish washing machines to prevent baking food particles on dishes.

Science News Letter, September 1, 1951

☼ **VIBRATION-FREE** trigger for match-shooting rifle employs a system of multiplying levers. Trigger movement of less than five thousandths of an inch is increased by the levers about five times to activate the firing pin. Trigger pull is adjustable from 2.5 to six pounds.

Science News Letter, September 1, 1951

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